

A greyish brown male form of *Antheraea diehli* LEMAIRE, 1979 from Borneo (Lepidoptera: Saturniidae)

Wolfgang A. NÄSSIG und Jan BECK

Dr. Wolfgang A. NÄSSIG¹, Entomologie II, Forschungsinstitut und Museum Senckenberg, Senckenberganlage 25, D-60325 Frankfurt am Main, Germany; email: wolfgang.naessig@senckenberg.de

Dr. Jan BECK, Lehrstuhl für Tierökologie, Biozentrum, Universität Würzburg, Am Hubland, D-97074 Würzburg, Germany; email: jan.beck@gmx.net; present address: Kuala Belalong Field Studies Centre, Dept. of Biology, Universiti Brunei Darussalam, Tungku Link, Gadong BE1410, Brunei Darussalam

Eine graubraune Männchenform von *Antheraea diehli* LEMAIRE, 1979 von Borneo (Lepidoptera: Saturniidae)

Zusammenfassung: In Brunei wurde von der bisher nur in Gelborange bekannten *Antheraea* (*Antheraea*) *diehli* LEMAIRE, 1979 eine graubraune Farbvariante gefunden.

Antheraea (*Antheraea*) *diehli* LEMAIRE, 1979 is a member of the *helferi*-group of species within the genus *Antheraea* HÜBNER, [1819] *sensu stricto* (see NÄSSIG 1991, U. PAUKSTADT et al. 2000). The species is so far known from the following regions of Sundaland: Sumatra: LEMAIRE (1979, type locality), NÄSSIG et al. (1996a); possibly (but see below, paragraph on the identification of the ♀♀) also Nias: BUCHSBAUM & BRÜGGEMEIER (1996; the site was at 20 m a.s.l.)²; West Malaysia: LAMPE (1984, 1985); Borneo: ALLEN (1981), HOLLOWAY (1987), NÄSSIG et al. (1996b); possibly Java: some ♀ specimens with this island data are deposited under “*A. diehli*” in the collections of Zoological Museum, Amsterdam, and Naturalis [formerly RMNH], Leiden (NÄSSIG et al. 1996a, b); however, U. PAUKSTADT et al. (2003) do not list *diehli* for Java, because ♀♀ identifications are unreliable, see below. U. PAUKSTADT et al. (2000) placed this species, perhaps unnecessarily, together with some further continental taxa into a *yamamai*-subgroup within the *helferi*-group, characterized by an only weakly developed apex falcation of the ♂ forewing (in contrast to the other species, which always have a very well developed falcate forewing apex of ♂♂). The apparent scarceness of *A. diehli* in collections may possibly be caused by the species’ preference for lowland localities; those have been much more intensively converted into cultivated land than mountainous biotopes. In contrast, *A. helferi* and other taxa can also be found at higher elevations, although there is a broad overlap of the altitudinal distribution of these taxa.

All ♂ specimens of *A. diehli* known thus far (those published and illustrated as well as specimens seen by the senior author in different European museums and private collections) were of an orange-yellow ground colour (see Fig. 1). One ♂ specimen collected at light in Borneo, Sabah, Danum Valley, on 23. III. 2003 (Fig. 2), however,

shows a greyish-brown ground colour. All other characters (wing shape, patterns) agree with the yellow *diehli* ♂♂.

Colour polymorphism is known from most *Antheraea* species, either occurring in two or three distinct colour forms or exhibiting a broad, more or less continuous colour variation. Such polymorphism is sometimes also combined with pattern variation of some degree, especially so in ♂♂. The Palearctic species *A. (A.) yamamai* GUÉRIN-MÉNEVILLE, 1861, which is quite similar and thus perhaps closely related to *A. diehli*, is known for an extraordinarily wide range of different colour morphs in both sexes. Hence, the existence of such a greyish-brown ♂ form in *A. diehli* is not surprising, although it was not observed before.

A notorious problem in the taxonomy of the *helferi*-group is that we still do not know reliable character differences to distinguish ♀♀ of *A. diehli* from related sympatric taxa with big yellow ♀♀, such as *helferi* MOORE, 1859, *borneensis* MOORE, 1892, or *imperator* WATSON, 1913 (altogether = “*helferi* s.l.”). During the light trapping sequences of the junior author in NE Borneo, ♂♂ of the Bornean representative of *A. helferi* [s. l.] as well as of *A. diehli* were found; a few accompanying yellow ♀♀ could therefore not be unambiguously determined. Regrettably, most specimens were not sampled but set free again. Further research, perhaps also based on chorion studies (see REGIER et al. 2005 and footnote 2), should be undertaken in future.

The brownish ♀ described and illustrated by NÄSSIG & SCHULZE (1997) was tentatively assigned to “*Antheraea* (*Antheraea*) *helferi borneensis* MOORE, 1892” just by the fact that we never found a single ♂ of *A. diehli* at this site (at 580 m elevation). Now, after having found a greyish-brown ♂ form of *A. diehli*, this assignment may perhaps require reconfirmation; the elevation is perhaps not so high to exclude *A. diehli*. — Interestingly, a similar brownish ♀ form as the one described by NÄSSIG & SCHULZE (1997) of a species with usually yellow ♀♀, with label data “Brunei, Labi, 7. VII. 1996, G. PING” (i.e., lowland), was contained in the Bornean moths collection of G.

¹ 66th contribution to the knowledge of the Saturniidae.

² This single ♀ from Nias was only deemed to “most likely” belong to *A. diehli* by BUCHSBAUM & BRÜGGEMEIER (1996). REGIER et al. (2005) noticed that the morphology of the chorion of the eggs appears to provide a difference to distinguish the two taxa *diehli* and *helferi* [*sensu lato*]: in *A. helferi*, the eggs show fully developed aeropyle crowns, localized to a circumferential band, while in *A. diehli*, there are only aeropyle mounds (as taken from the SEM pictures in BUCHSBAUM & BRÜGGEMEIER 1996 — thus “confirming” their identification by circular reasoning). The data base for this hypothesis is, therefore, still weak, but it is in fact the first real hint for a difference at least in the egg morphology (and thus also for ovipositing ♀♀!) between ♀♀ of the two species *A. diehli* and *A. helferi* s.l. Further research is necessary to confirm this hypothesis.

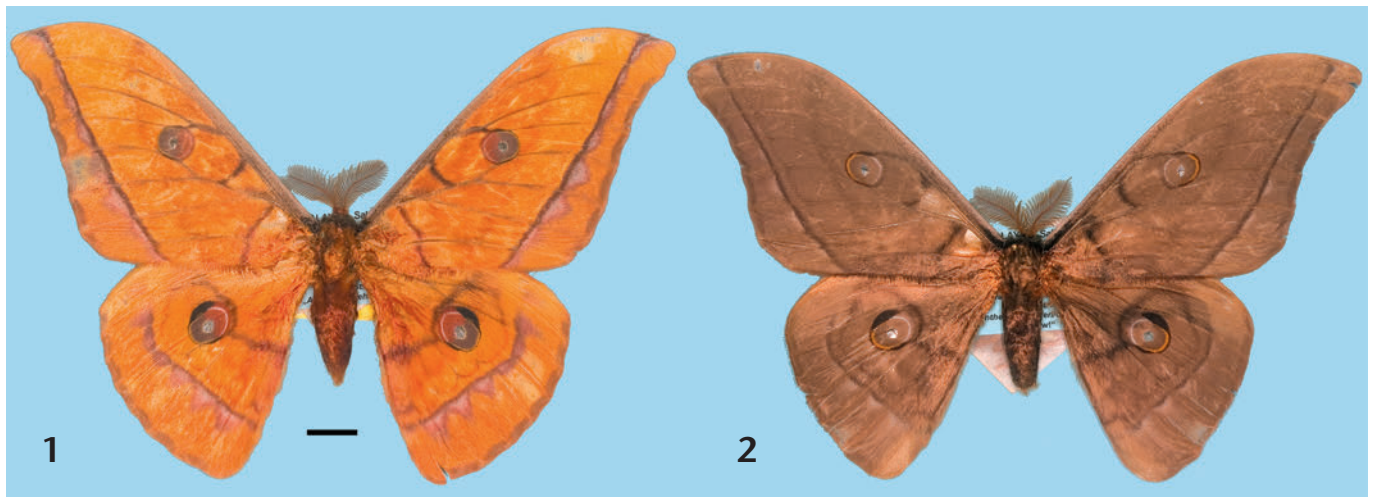


Fig. 1: *Antheraea diehli*, ♂, normal yellow form, "Malaysia, Sabah, Danum Valley, DV1a, 4,965° N, 117,796° E, 220 m, Lowland Dipterocarp Primary Forest, dense understorey below DV1, 16. xii. 2003, 125 W Hg-Dampf, 18.50–4.30 h, leg. Jan BECK". **Fig. 2:** *Antheraea diehli*, ♂, greyish brown form, [same locality], "23. iii. 2003, 45 W Schwarzlicht, 18.00–6.00 h, leg. Jan BECK". Both specimens deposited in Senckenberg-Museum, Frankfurt am Main. — Photographs: D. KOVAC. — Scale: 1 cm; both specimens to the same scale.

PING, which was recently donated to Senckenberg (see NÄSSIG 2004).

The other species of Saturniidae that were recorded by the junior author at light together with the specimens dealt with here will be published elsewhere (BECK & NÄSSIG in prep.).

Thanks to U. PAUKSTADT for sending a reprint and discussion.

References

- ALLEN, M. G. (1981): The saturniid moths of Borneo with special reference to Brunei [including taxonomic appendix by J. D. HOLLOWAY, pp. 121–126]. — Brunei Museum Journal, Brunei Darussalam, 5: 100–126.
- BUCHSBAUM, U., & BRÜGGEMEIER, F. (1996): *Antheraea* (*Antheraea*) *diehli* LEMAIRE discovered on Nias Island, with notes on the eggs and a rearing attempt (Lepidoptera) [= The Saturniidae of Sumatra, Appendix II]. — Heterocera Sumatrana, Göttingen, 10: 171–174.
- HOLLOWAY, J. D. (1987): The moths of Borneo, part 3, Lasiocampidae, Eupterotidae, Bombycidae, Brahmaeidae, Saturniidae, Sphingidae. — Kuala Lumpur (Southdene), 200 pp. + pls.
- LAMPE, R. E. J. (1984): Die Saturniiden der Cameron- und Genting-Highlands in West-Malaysia (Lepidoptera: Saturniidae). — Neue Entomologische Nachrichten, Keltern, 11: 2–15 + 8 pls.
- (1985): Malayan Saturniidae from the Cameron & Genting Highlands. A guide for collectors [internal title: The Saturniidae of the Cameron and Genting Highlands of Western Malaysia]. [English translation of LAMPE 1984. — Faringdon (E. W. Classey), 16 pp. + 8 pls.
- LEMAIRE, C. (1979): Description de trois Attacidae Indo-Australiens. — Lambillionea, Revue bimestrielle, Bruxelles, 78 (11/12): 89–96.
- NÄSSIG, W. A. (1991): New morphological aspects of *Antheraea* HÜBNER and attempts towards a reclassification of the genus (Lepidoptera, Saturniidae). — Wild Silkmoths '89-'90 (eds. H. AKAI & M. KIUCHI): 1–8. (Proceedings of the 1st International Conference on Wild Silkmoths)
- (2004): Sammlung von Nachtfaltern aus Brunei (Nordborneo) von Glenn R. PING an das Museum Senckenberg geschenkt (Lepidoptera: Heterocera). — Nachrichten des Entomologischen Vereins Apollo, Frankfurt am Main, N.F. 25 (3): 129.
- , LAMPE, R. E. J., & KAGER, S. (1996a): The Saturniidae of Sumatra (Lepidoptera). — Heterocera Sumatrana, Göttingen, 10: 3–110.
- , —, & — (1996b): Appendix I: The preimaginal instars of some Sumatran and South East Asian species of Saturniidae, including general notes on the genus *Antheraea* (Lepidoptera). — Heterocera Sumatrana, Göttingen, 10: 111–170.
- , & SCHULZE, C. H. (1997): Eine bisher unbekannte braune Weibchenform bei *Antheraea* (*Antheraea*) *helferi borneensis* MOORE, 1892 von Borneo (Lepidoptera: Saturniidae). — Nachrichten des Entomologischen Vereins Apollo, Frankfurt am Main, N.F. 18 (2/3): 149–155.
- PAUKSTADT, U., BROSC, U., & PAUKSTADT, L. H. (2000): Preliminary checklist of the names of the worldwide genus *Antheraea* HÜBNER, 1819 ("1816") (Lepidoptera: Saturniidae). Part I. — Galathea, Berichte des Kreises Nürnberger Entomologen e.V., Nürnberg, Supplement 9: 1–59.
- , SUHARDJONO & PAUKSTADT, L. H. (2003): Notes on the distribution of the genus *Antheraea* HÜBNER, 1819 ("1816") and on some selected hosts of the larvae of this genus in the Indonesian Archipelago (Lepidoptera: Saturniidae). — Galathea, Berichte des Kreises Nürnberger Entomologen e.V., Nürnberg, Supplement 14: 25–64.
- REGIER, J. C., PAUKSTADT, U., PAUKSTADT, L. H., MITTER, C., & PEIGLER, R. S. (2005): Phylogenetics of eggshell morphogenesis in *Antheraea* (Lepidoptera: Saturniidae): unique origin and repeated reduction of the aeropyle crown. — Systematic Biology 54 (2): 254–267.